ACCLIMATIZATION OF FOLIAGE PLANTS

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Research has shown that acclimatization prior to placement indoors is beneficial for some plants. The length of the acclimatization period as well as the type required for plants varies. Recent work indicates that it is possible to acclimatize plants in the production area. In order to accomplish this, plants should be grown under specific light intensities and on controlled nutritional and watering regimes. Factors known to be important are: production or acclimatization under shade; correct nutrition with a reduction near the end of the crop cycle; and watering procedures and soil media that encourage growth of extensive root systems.

Adaptation of plants to varying light intensities has been known for years. The adaptation takes several forms and, under high light, plants produce smaller, thicker foliage, stacking of chloroplasts in cells and vertical orientation of grana within chloroplasts. These are protective mechanisms to prevent injury to cell components from high light intensity but reduce the ability of plants to fully utilize the light to produce carbohydrates (food) through photosynthesis. Although this presents no problem while the plant is under high light in the production area, movement of a plant grown under high light intensities to an interior location will present problems because the compensation point (the point at which food required by the plant in respiration is equal to the amount produced by photosynthesis) of the plant is not acclimatized to these conditions.

A plant grown under high light intensity has a higher compensation point than it would have if grown in heavy shade. Therefore, even though 100 footcandles of light may be sufficient for a shade-grown plant when moved indoors, 200 footcandles may not be sufficient for a plant that was grown in the sun.

Light acclimatization has been considered to be conversion of a high light grown plant to low light intensities of interior environments. Research in Florida has shown that, with Ficus benjamina, placement under 80% shade for five weeks reduced leaf drop by 50% when plants were subsequently placed under interior conditions. Additional acclimatization for 10 or 15 weeks was also beneficial, but not of the magnitude of the first five weeks.

Several problems have been noted with acclimatization of sun grown Ficus and Brassaia that influence consumer acceptance. Research has yet to show whether sun grown leaves can be converted to shade leaves. After placement indoors, some plants drop most of the original sun grown foliage within a few months, while foliage produced under shade remains on the plant.

Plants grown in the shade are better adapted to indoor conditions because the leaves are thinner and larger while the chloroplasts are dispersed within cells and grana have a horizontal orientation. These properties enable the leaves to absorb more light energy. This allows them to photosynthesize more efficiently under low light conditions. Brassaia grown under full sun have light green foliage with short petioles, but when placed indoors, petiole length increases by 50 to 100% and leaves become dark green.

The minimum required light intensity depends on where the plant was grown. For sun grown plants, the minimum suggested interior light intensity is 150 footcandles with a 10 to 12 hour duration, seven days a week. Shade grown plants or acclimatized plants should have 75 to 100 footcandles.

Light quality is also important for plant growth, but little growth is desired in most interior situations. Normally, one should supply light in both the blue, 430 to 470 nm (namometers or millicons) and red, 650 to 700 nm wave lengths. However, excellent quality tropical foliage plants can be maintained with predominantly fluorescent lighting.

It is curious to note that of the foliage produced in California, Florida and Texas, approximately 85% of these plants are shade grown. Only 15% are sun grown, and some of these are acclimatized before shipment. Most commonly, the only plants grown in full sun are Ficus, Brassaia, Dracaena marginata, several palms, Araucaria and Sansevieria.

Nutrition is directly related to acclimatization because a plant's need for fertilizer decreases by a factor of 10 or more after placement indoors. The problem, then, is what happens to a plant after it is removed from the production area where higher nutrition is necessary for growth to low light interiors where much lower levels are desired. Commonly, on sensitive plants such as palms, dracaenas, schefflera and greenhouse grown foliage, a rapid loss in quality may occur due to excessive fertilizer (high soluble salts). Symptoms are burned foliage, general loss of color, foliage drop and, in severe cases, plant death. Even without these toxicities, high nutrient levels may encourage undesirable

growth. Nutritional acclimatization depends on how the plant was grown and the light intensity under which the plant was grown.

The best way to acclimatize plants is to stop addition of fertilizer, leach soil heavily with at least 6 inches of water and reduce light to several hundred footcandles. While leaching and the use of lower fertilizer levels are beneficial, the optimum length of acclimatization before placement indoors varies greatly with species. During acclimatization, root system size can be improved by reducing nutrition and lengthening the watering interval. This method reduced top growth more than root growth with a subsequent increase in root to shoot ratio. This will also harden foliage so it will be less likely to wilt under low humidity situations.

Suggested Additional Reading

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